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EPA Region 5 Records Ctr.



200092

March 26, 2003

Mr. Jeff Keiser
CH2M-Hill
135 S. 84th St.
Suite 325
Milwaukee, WI 53214

Subject: Transmittal of calculated PCB mass by layer, Plainwell and Otsego City Impoundments

Dear Mr. Keiser,

This letter serves to transmit our estimates of PCB mass by layer for the Plainwell and Otsego City Impoundment exposed sediments, based on our final interpolations of all applicable PCB data. This letter serves as a hard copy follow-up to our email of March 24, 2003. It is our understanding that EPA plans to use the FIELDS interpolation, in its current form, in the RI. Given our view, described below, that the FIELDS analysis overestimates the PCB mass, especially at depth, we request that the LTI analysis also be included in the draft RI report.

The estimates summarized in the attached spreadsheet are based on our most current interpolation methods, which involve the following steps: coordinate straightening to account for the irregular shape of the impoundment, kriging of log-transformed PCB, and back-transformation and bias correction to provide estimates of mean concentrations throughout the two impoundments. The current methods are essentially the same as those we discussed with you and the EPA FIELDS group at our meeting in Chicago on November 1, 2002. Since that time, we have adopted the final dataset circulated by FIELDS in early December (email: Vilma Rivera-Carrero, 12/4/02), and have added the final step of bias correction to address concerns that our methods provide local estimates of the geometric mean, rather than the true (arithmetic) mean.

Our methods are consistent with the best current practice in geostatistical interpolation, and as such represent a reasonable estimate of the distribution of PCB in the impoundments. Our methods have been reviewed and endorsed by Dr. Noemi Barabas, a geostatistician and researcher at the University of Michigan.

As noted in our email, our comparisons with EPA's interpolations show significant differences, particularly at depth. As we have expressed to you, we do not believe the interpolation methods utilized by FIELDS reflect the actual PCB mass present in the exposed sediments. Major differences can be characterized as follows:

Vertical extrapolation: in a number of cases, cores show low or decreasing concentrations in the surface layers, and no data at depth. We have used such data to infer locations that are unlikely to have high concentrations at depth, and constrained our interpolation accordingly. This was not done in the FIELDS interpolation, resulting in PCB mass and concentration estimates at depth that are, in many cases, based upon no actual data, unrealistic and in error.

Outward extrapolation: In a number of locations, isolated data are used in the FIELDS interpolation to extrapolate concentration estimates out to the edge of the impoundment (notably, Otsego City, near KPT 79). Because the natural neighbor method used by FIELDS does not take into account the spatial correlation structure of the PCB data, the range to which such concentrations can be extrapolated is unlimited, and produces unrealistic estimates of PCB mass and concentration in several cases.

Effects of PCB Distribution: The natural neighbor method as applied by FIELDS tends to emphasize high concentration data in terms of their influence on neighboring areas. This can be seen clearly in maps of the FIELDS interpolation results with data superimposed, in which low concentration data appear to have very limited influence on interpolated concentrations in the vicinity of higher concentration data. While the natural neighbor method is in itself a valid interpolation method, we

would argue that in this application the disproportionate influence of high concentration samples results in an unreasonable upward bias in estimates of SWAC and mass

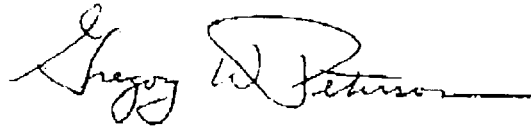
We value the collaborative efforts taken by FIELDS, CH2M-Hill, and LTI to date, including the development of a common, reviewed dataset, discussions regarding appropriate data reduction and interpolation methods, and comparisons of final results. These efforts have contributed significantly to the good faith advancement of the project, and we feel that the FIELDS group in particular has done much to contribute to an atmosphere of openness and high technical standards. We hope to continue with this approach in the future.

We would be happy to discuss any element of our analysis and conclusions with you.

Regards,
Limno-Tech, Inc.



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